(12) UK Patent Application (19) GB (11) 2 381 367 (13) A

(43) Date of A Publication 30.04.2003

(21) Application No 0125709.6

(22) Date of Filing 26.10.2001

(71) Applicant(s)
Writespeed Limited
(Incorporated in the United Kingdom)
Severn Acres, Whittington Road,
WORCESTER, WR5 2RA, United Kingdom

(72) Inventor(s)
John Smith

(74) Agent and/or Address for Service
Barker Brettell
138 Hagley Road, Edgbaston,
BIRMINGHAM, B16 9PW, United Kingdom

(51) INT CL[7]
G09B 21/04 // G09B 19/12

(52) UK CL (Edition V)
G5C CFF
U1S S1845

(56) Documents Cited
US 6213617 B US 4655546 A
US 4631848 A

(58) Field of Search
UK CL (Edition T) G5C CDBP CFF
INT CL[7] B60C 13/00, G09F 19/12 21/04
Other: Online : WPI, EPODOC, JAPIO

(54) Abstract Title
Information display

(57) A tyre 1 has markings 3 on the sidewall 2 arranged to produce indicia 101-110 that become legible to an observer on rotation of the tyre 1 at a pre-determined angular velocity.

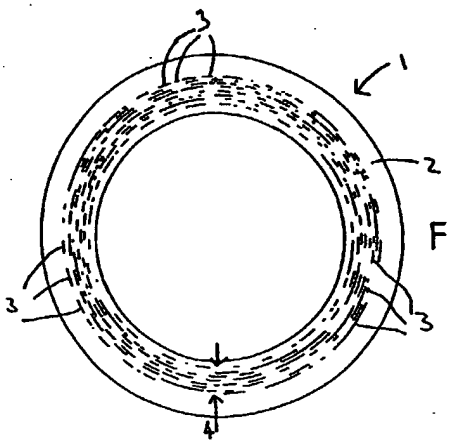

FIG. 1a.

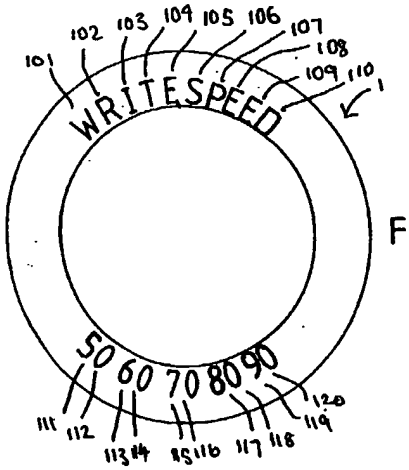

FIG. 1b.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

GB 2 381 367 A

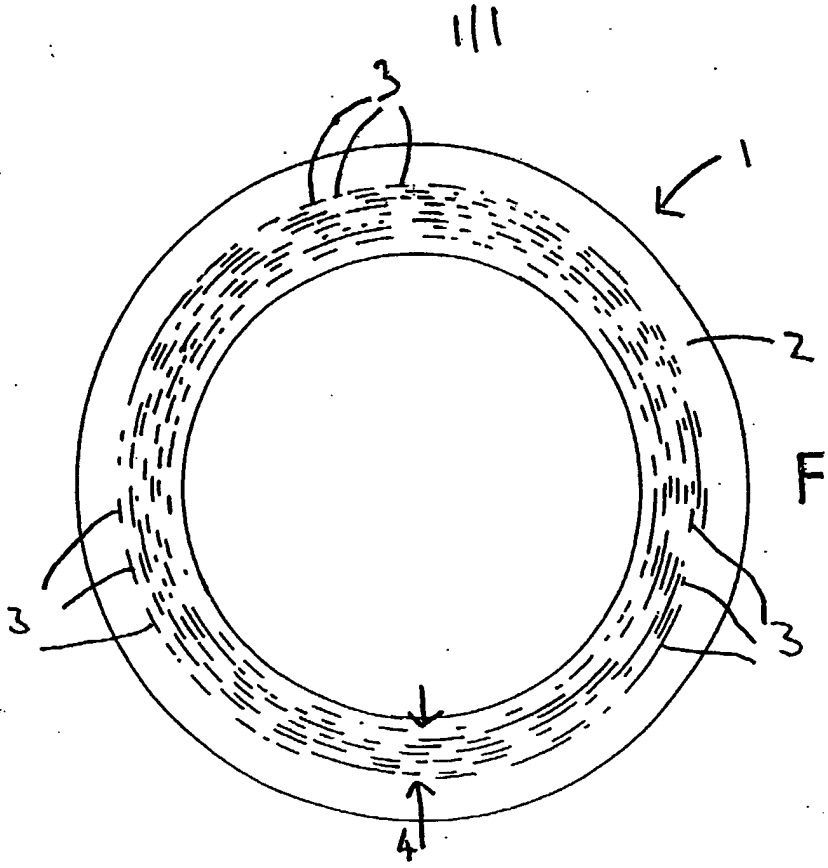
111
3
1
2
3
3
4

FIG. 1a.

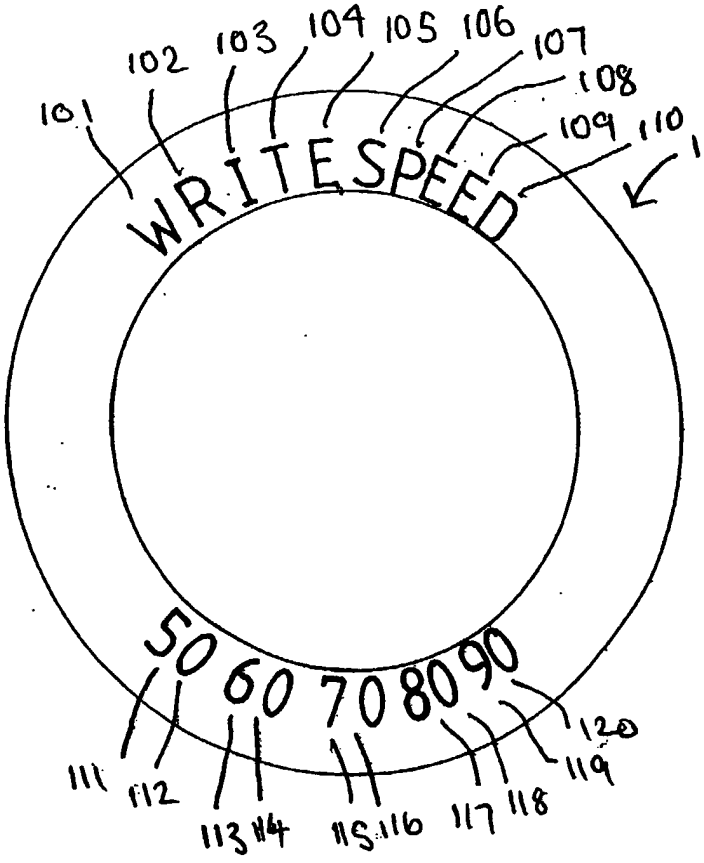
101
102
103
104
105
106
107
108
109
110
1
WRITESPEED
50
60
70
80
90
111
112
113
114
115
116
117
118
119
120

FIG. 1b.

INFORMATION DISPLAY

This invention concerns improvements in or relating to information display. In particular, but not exclusively, the invention concerns information display on articles such as tyres and the invention will be described herein after with reference to a tyre for convenience. It will be understood, however, the invention is not limited to tyres and includes information display on other rotatable articles.

It is well known that manufacturers place information on the sidewalls of tyres, for example the manufacturer's name and/or other information such as the tyre size. Typically, the information is moulded on the sidewall of the tyre and is the same colour as the tyre. The information is only legible to an observer when the tyre is not rotating.

Therefore, it is an object of the invention to provide an article for displaying information legible to an observer when the article is rotating.

It is a preferred object of the invention to provide a tyre and a method of making a tyre that can display information legible to an observer at least when the tyre is rotating.

A first aspect of the invention provides a tyre having a sidewall provided with markings on the sidewall wherein, upon rotation of the tyre, the markings produce an indicium legible to an observer.

A second aspect of the invention provides a method of making a tyre having a sidewall comprising the step of providing markings on the sidewall such that, upon rotation of the tyre, the markings produce an indicium legible to an observer.

As used herein the term "indicium" includes a letter, a numeral, logo, picture, pictorial representation or the like.

A tyre according to the invention has the advantage that the indicium can be seen when the tyre is rotating. Therefore, information, including advertisements can be communicated to an observer.

In one arrangement the indicium is a letter. In another arrangement the indicium is a numeral. In yet a further arrangement the indicium is a logo, picture or pictorial representation.

Preferably, the indicium is of a colour different to the colour of the sidewall of the tyre. This is advantageous as the indicium can be clearly distinguished from the sidewall of the tyre.

The markings may be formed so that the indicium is legible at a predetermined angular velocity of the tyre. Alternatively, the markings may enable the indicium to be seen over a range of angular velocities of the tyre.

Each marking is formed to have a shape and/or configuration and/or pattern such that the desired indicium is produced at the predetermined angular velocity or range of angular velocities of the tyre.

Thus, any of the attributes of length, width, curvature, distance from the centre of the tyre and orientation of the markings may be varied according to the indicium to be produced.

In one arrangement, at least one marking intersects at least one other marking. Alternatively, each marking is separate from any other marking.

Preferably, the markings form a repeating pattern around the sidewall.

In a preferred arrangement, the markings produce a plurality of indicia legible to an observer when the tyre is rotating. This is advantageous as a combination of indicia can be used to communicate more complex information i.e a word or combination of words. The plurality of indicia may be the same or different colours that distinguish from the sidewall.

Therefore, in one arrangement, the plurality of indicia is a combination of letters that form a word or combination of words. This arrangement is advantageous as the sidewall of the tyre can be used to advertise.

In a further arrangement, the plurality of indicia is a combination of numerals. This is advantageous as the sidewall of the tyre can be used to indicate the speed of a vehicle to which the tyre is fitted. Alternatively, the numerals may represent the angular velocity of the tyre.

In yet another arrangement, the plurality of indicia is a combination of letters and numerals that can be used for advertising and/or to indicate speed.

Providing markings that become legible when the tyre is rotating has many potential uses and is believed to be of particular benefit in motor racing and similar sports where the markings may be used for advertising and/or to provide an indication of speed that can be seen by spectators.

In a further arrangement the markings on the sidewall produce a first indicium legible to an observer at a first range of angular velocities of the tyre and a second indicium legible to an observer at a second range of angular velocities of the tyre. The first indicium may be the same or different colour to the second indicium.

Preferably, a first plurality of indicia are produced at the first range of angular velocities and a second plurality of further indicia are produced at the second range of angular velocities.

The first and second pluralities of indicia may be letters representing a word or combination of words that are legible at different angular velocities of the tyre. The word or combination of words may be the same or different. In this way, the tyre may be used for multiple advertising.

Alternatively, the first and second pluralities of indicia may be numerals representing the approximate speed of the vehicle at different angular velocities of the tyre. In this way, the speed of a vehicle may be observed. This may be useful in assisting the police force or insurance companies to determine the speed of a vehicle involved in an accident.

The first plurality of indicia may be of the same or different colours and these may be the same or different to the colours of the second plurality of indicia.

In this way, colour can be used to distinguish between indicia produced at the same angular velocity of the tyre and/or to distinguish between indicia produced at different angular velocities of the tyre.

The tyre may be provided with markings on one sidewall only. With this arrangement, the indicium produced by the markings when the tyre is rotating can only be seen from one side of the tyre.

Alternatively, the tyre may be provided with markings on both sidewalls. In this way, the indicium produced by the markings can be seen from each side of the tyre. This is advantageous for use on bicycles or motorcycles where both sides of the tyre are visible. It is also advantageous for use on cars or similar vehicles, where the tyre can be fitted with either sidewall of the tyre showing.

The markings may be applied to the side wall of a finish tyre by any suitable method. For example, the markings may be applied to the sidewall by painting or the like. Alternatively, the markings may be formed separately and attached to the sidewall by adhesive or the like.

Preferably, the markings are formed by an automated machine under the control of a computer programmed to produce the desired shape and/or configuration and/or pattern of the markings. This facilitates forming the markings with a high degree of accuracy.

In a different method, the markings are formed integrally with the tyre during manufacture. For example, the markings may be moulded onto the sidewall of the tyre.

The invention will now be described in more detail by way of example only with reference to the accompanying drawings which illustrate the following:

Figure 1A is a side view of tyre according to the invention shown stationary; and

Figure 1B is a side view of the tyre of Figure 1A shown rotating.

Figure 1A shows a tyre 1 according to the invention stationary. The tyre 1 has a sidewall 2 and a plurality of marks 3 on the sidewall 2.

In this embodiment the plurality of marks 3 are spray painted on to the sidewall 2. However, it will be understood that in an alternative embodiment the marks 3 can be moulded separately or integrally with the sidewall 2 of the tyre 1.

The marks 3 are formed on the sidewall 2 such that, when the tyre 1 is rotated within a particular range of angular velocities, indicia become legible to an observer.

Figure 1B illustrates the type of indicia that may be produced when the tyre 1 is rotating at an angular velocity within the particular range of angular velocities that the indicia become legible to an observer.

Indicia 101-110 are discrete letters that form the word "Writespeed" and become legible when the tyre 1 is rotating at a pre-determined angular velocity or within a pre-determined range of angular velocities.

In this embodiment, the indicia 101-110 are of the same colour that contrasts with the colour of the sidewall 2 to distinguish the word from the sidewall 2. It will be appreciated however that the indicia 101-110 could be of different colours that contrast with the colour of the sidewall 2.

Indicia 111-112 are discrete numerals that form the number "50" and become legible when the tyre 1 is rotating at an angular velocity corresponding to a speed of 50 mph. Likewise, indicia 113-120 are discrete numerals that form the numbers "60", "70", "80" and "90" and become legible when the tyre 1 rotates at different angular velocities corresponding to speeds of 60 mph, 70 mph, 80 mph and 90 mph. It will be understood that only the indicia representative of the vehicle speed become legible at that speed.

Again, indicia 111-120 may be of the same or different colours that contrast with the colour of the sidewall 2 to distinguish the numbers from the sidewall 2. In this way, the speed of a vehicle to which the tyre 1 is fitted may be apparent to an observer.

The marks 3 are positioned within an annular band 4 on the tyre sidewall 2 and each mark 3 has a number of attributes that define the indicia produced and the range of angular velocities of the tyre at which the indicia will become legible to an observer. The marks 3 may form a repeated pattern around the tyre 1.

The marks 3 may be straight lines or curved lines i.e. the curvature of each mark may vary from mark to mark. The marks 3 can intersect each other or be completely separate from each other. The average width of each mark 3 may be different from mark to mark and the width of any one mark may vary throughout its length. The length of each mark and the height that each mark protrudes from the sidewall 2 may be different from mark to mark. The distance of each mark 3 from the centre of the tyre 1 may also vary from mark to mark. However, any number of

marks 3 may be identical with the exception that they are positioned in different places on the sidewall 2.

In one embodiment, it is believed the marks 3 can be equal angular arc segments of an indicium to be produced. For example, when the indicium is legible to an observer, the indicium appears to extend along an arc, of angle θ, of the tyre. The n marks 3 that form the indicium consist of arc portions of the indicium. Each mark 3 is an arc of angle θ/n of the indicium. The marks 3 are positioned around the tyre 1 at equal angular separations from each other and at an equal radial distance from the centre of the tyre 1. The angular separation of each mark 3 defines the range of angular velocities that the indicium is legible to the observer.

Alternatively, each mark 3 is a complete indicium positioned around the tyre at an equal angular separation from at least one other mark.

It is believed there are a number of different arrangements of the marks 3 on the sidewall 2 that will result in substantially the same indicia being produced upon rotation of the tyre 1 at a particular angular velocity. For example, the angular separation of each mark 3 may be doubled to produce a fainter but identical indicium.

The marks 3 are formed on the sidewall 2 by an automated machine under the control of a computer programmed to produce the marks 3 in exact predetermined positions. In this way, the marks 3 are formed with a high degree of accuracy.

In use, the tyre 1 is fitted to a vehicle wheel and rotates therewith. The rotation of the tyre 1 at an angular velocity within the predetermined range of angular velocities causes the plurality of marks 3 to visually

combine so an observer sees the desired indicia. It is believed that this effect is a consequence of the discrete sampling rate of the eye.

When the tyre 1 is moving above a certain angular velocity the observer can no longer perceive each mark 3 individually but samples the plurality of marks 3 at particular positions on the tyre 1 as it rotates. The observer visually combines the marks 3 so as to see the result of a superimposition of the marks 3 on the tyre 1.

At the majority of angular velocities of the tyre 1, the marks 3 form a blur as each mark 3 is sampled by the observer at a large number of different positions on the tyre 1 as the tyre 1 rotates. However, at a particular range of velocities of the tyre the marks 3 will be sampled by the eye to repeatably appear at certain positions on the tyre to form indicia.

If the tyre 1 rotates at an angular velocity much greater or less than the specified range of angular velocities then the indicia will become illegible to the observer.

It is believed that in some cases, small variations in the angular velocity of the tyre 1 from the pre-determined range of angular velocities at which the indicia are legible will produce the illusion of the indicia moving around the tyre 1 in the direction of rotation for greater angular velocities or opposite to the direction of rotation for lesser angular velocities.

It will be understood that the invention is not limited to the above-described embodiments.

The marks 3 may be formed by any combination of the processes described above, for example the marks 3 may be moulded onto the sidewall 2 of the tyre 1 and then painted a colour different from the colour of the sidewall 2.

In another arrangement the tyre 1 is formed having a sidewall 2 with an annular strip formed of a different colour rubber than the rest of the sidewall 2 i.e. white. A thin film of rubber or similar material of the same colour as the majority of the tyre (i.e. black) is then formed over the annular strip and small portions of this film are removed, eg by abrading, to reveal the (white) annular strip beneath and thus form the markings 3.

In yet another arrangement, the marks 3 are formed separately from the tyre 1 on a strip of rubber or other elastomer and the strip is attached to the tyre 1, for example by adhesive.

It will also be appreciated that the invention is not limited to use of the marks on the sidewalls of tyres and includes other rotatable objects where it is desired or advantageous to display information to an observer when the object is rotating. For example, the marks 3 may be used on rotatable blades such as aircraft propeller blades, helicopter rotor blades, fan blades and the like.

Other modifications and changes will be apparent to those skilled in the art and are deemed within the scope of the invention.

CLAIMS

1. A tyre having a sidewall comprising markings on the sidewall wherein, upon rotation of the tyre, the markings produce an indicium legible to an observer.

2. A tyre according to Claim 1 wherein the indicium is a letter.

3. A tyre according to Claim 1 wherein the indicium is a numeral.

4. A tyre according to Claim 1 wherein the indicium is a logo, picture or pictorial representation.

5. A tyre according to any one of the preceding Claims wherein the indicium is a colour different to the colour of the tyre.

6. A tyre according to any one of the preceding Claims wherein the indicium is legible at a predetermined angular velocity of the tyre.

7. A tyre according to any one of Claims 1 to 5 wherein the indicium is legible over a range of angular velocities of the tyre.

8. A tyre according to any one of the preceding Claims wherein at least one marking intersects at least one other marking.

9. A tyre according to any one of Claims 1 to 7 wherein each marking is separate from any other marking.

10. A tyre according to any one of the preceding Claims wherein the markings form a repeated pattern around the sidewall.

11. A tyre according to Claim 1 wherein the markings produce a plurality of indicia legible to an observer when the tyre is rotating.

12. A tyre according to Claim 11 wherein the plurality of indicia are the same colour.

13. A tyre according to Claim 11 wherein the plurality of indicia are of different colours that distinguish from the sidewall.

14. A tyre according to any one of Claims 11 to 13 wherein the plurality of indicia is a combination of letters that form a word or combination of words.

15. A tyre according to any one of Claims 11 to 13 wherein the plurality of indicia is a combination of numerals.

16. A tyre according to any one of Claims 1 to 13 wherein the plurality of indicia is a combination of letters and numerals.

17. A tyre according to Claim 1 wherein the markings on the sidewall produce a first indicium legible to an observer at a first range of angular velocities of the tyre and a second indicium legible to an observer at a second range of angular velocities of the tyre.

18. A tyre according to Claim 17 wherein the first indicium is the same colour as the second indicium.

19. A tyre according to Claim 17 wherein the first indicium is a different colour to the second indicium.

20. A tyre according to any one of Claims 17 to 19 wherein a first plurality of indicia are produced at the first range of angular velocities and a second plurality of further indicia are produced at the second range of angular velocities.

21. A tyre according to Claim 20 wherein the first and second plurality of indicia are letters representing a word or combination of words that are legible at different angular velocities of the tyre.

22. A tyre according to Claim 21 wherein the word or combination of words of the first and second plurality of indicia are different.

23. A tyre according to Claim 20 wherein the first and second pluralities of indicia are numerals representing the approximate speed of a vehicle at different angular velocities of the tyre.

24. A tyre according to any one of Claims 20 to 23 wherein the first plurality of indicia are of different colours and are the same or different colour to the colours of the second plurality of indicia.

25. A tyre according to any one of the preceding Claims wherein markings are on both sidewalls of the tyre.

26. A method of making a tyre having a sidewall comprising the step of providing markings on the sidewall such that, upon rotation of the tyre, the markings produce an indicium legible to an observer.

27. A method of making a tyre according to Claim 26 wherein the marks are formed to have a shape and/or configuration and/or pattern

such that the desired indicium is produced at a predetermined angular velocity or range of angular velocities of the tyre..

28. A method of making a tyre according to Claim 26 or Claim 27 wherein the markings are applied to the sidewall by painting.

29. A method of making a tyre according to Claim 26 or 27 wherein the markings are formed separately to the tyre and attached to the sidewall by adhesive.

30. A method of making a tyre according to any one of Claims 26-29 wherein the markings are formed by an automated machine under the control of a computer, programmed to produce the desired shape and/or configuration and/or pattern of the markings.

31. A method of making a tyre according to Claim 26 or 27 wherein the markings are formed integrally with the tyre during manufacture.

32. A tyre substantially as hereinbefore described with reference to the accompanying drawings.

33. A method of manufacturing a tyre substantially as hereinbefore described with reference to the accompanying drawings.

INVESTOR IN PEOPLE

Application No: GB 0125709.6 **Examiner:** Paul Makin
Claims searched: 1-33 **Date of search:** 16 May 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): G5C (CDB, CFF)

Int Cl (Ed.7): B60C 13/00 ; G09F 19/12, 21/04

Other: Online : WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	US 6213617 B1	(BARKER) see lines 48-64, column 2	1-16, 26-29
X	US 4655546	(NAGASAKA) whole document	1-16, 26-31
X	US 4631848	(IWASA) whole document	1-16, 26-31

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.